

INTERAKSI STRUKTUR DAN TANAH BERLAPIS AKIBAT BEBAN HARMONIK DENGAN MENGGUNAKAN INTEGRAL TRANSFORM METHOD DAN FINITE ELEMENT METHOD (ITM-FEM COUPLING)

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Modeling soil-structure interaction subjected to harmonic load is important, particularly the harmonic problem at boundary domain. Calculation at the boundary is complicated due to the wave forwarded to the infinity and reflections that come back. Some research is conducted to develop a model that utilizes Integral transform to get response from the structure and its interaction with soil layer subjected to harmonic load. Methodology: A mathematical model is developed on the interaction between half space layer and the structure on it, with soil layer below (half space). The analysis utilizes a partial differential coupled Lamé equation. Simulation results show that the developed model can calculate response from the structure and soil layer subjected to harmonic load by ITM – FEM coupling. Results carried out on layered soil show that the maximum amplitude resultant displacements U_z , depends highly on various loads that work in the half space layer, comparison of soil elastic modulus values E_1/E_2 , comparison of soil damping values ξ_1/ξ_2 , and also comparison of soil density value of each soil layer ρ_1/ρ_2 . The impact of E_1/E_2 value on the maximum amplitude resultant displacements U_z is higher compared to the impact of ξ_1/ξ_2 damping values or ρ_1/ρ_2 soil density values.

Keywords: harmonic load, half space layer, partial coupled Lamé, ITM-FEM coupling, elastic modulus, resultant amplitude.